

Selected Portions of the United States Army Corp of Engineers Sign Standards Manual

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This document is available as publication EP 310-1-6A and EP 310-1-6B (two volumes) and is available at no cost. Contact the USACE via its web site (see section VI.B) to request these documents. Make sure to request all updates when ordering this document, as there have been several updates to the manual.

(Note: Numbers/letters in parentheses indicate the original section in the USACE manual)

This section describes the principles of signing. Included is information on: message preparation and sign legend content, mounting methods and placement guidelines, material selection, and maintenance procedures. It is important that these guidelines be followed when planning, specifying, and placing signs at Corps projects.

Each sign in this manual has been designed for a specific purpose and is available from approved sources.

All standard identification and directional signs are made to order. They follow specified grids, material specifications, and fabrication techniques. All signs shown in this manual are part of a total Corps of Engineers sign system.

Each type of sign used on a Corps project or facility has been specified in this manual either by function (identification, directional, informational, safety, etc.) or by location (campground, boat ramp, lock, dam, building interior, etc.).

All signs in this manual have been designed around their intended function. For example, signs requiring an immediate response from the viewer are succinctly worded. Signs viewed from moving vehicles are sized larger than signs read by

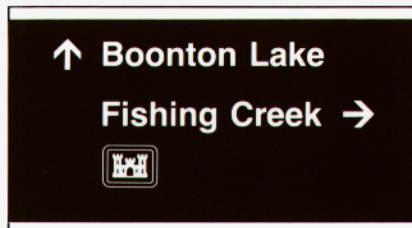
pedestrians. Safety and traffic signs adopt standard colors for maximum recognition. Informational signs placed at recreation areas are designed to be visually harmonious with the environment.

Because of the variety of environmental conditions affecting sign placement, and because of the different legends on signs for specific locations, effective sign program implementation requires a clear understanding of the following principles and guidelines.

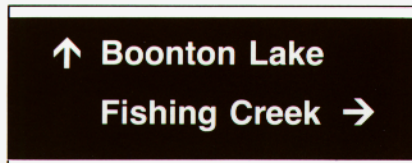
Questions not answered in this manual should be referred to the District/Division sign coordinator.

A sign is designed for the first-time viewer. It is important that sign legends be brief, using as few words as possible to communicate the desired message. Use words or terms that are easy to understand.

All signs, with the exception of directional signs, should convey no more than one concept or thought. Two thoughts require two separate signs. For this reason, the Corps Castle should not be placed on signs other than those used specifically for identification and as indicated in this manual.

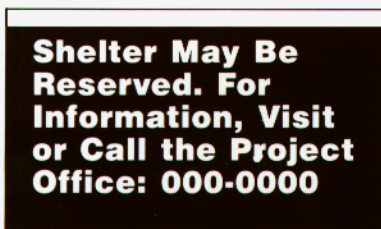


Incorrect: Use of Corps Mark on directional sign is not acceptable

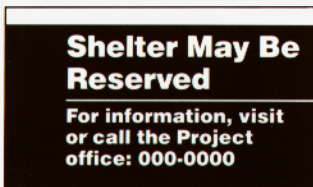


Correct: No unnecessary information on directional sign

The messages placed on signs should be concise, preferably no more than ten words. If a long legend is required to convey the necessary information, place a short descriptive headline, in larger letters, over



Incorrect: Message long and wordy



Correct: Headline gives priority to most important information

the text. This headline gives priority to the information and increases the "glance" legibility of the sign (see page 2.3).

Naturally, signs intended for viewing from a moving vehicle require greater brevity than those viewed by pedestrians.

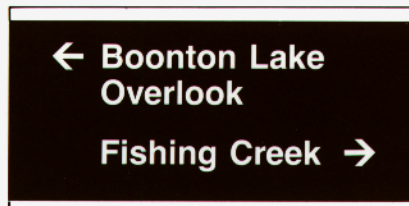
To decide what words should be placed on a sign, here are some guidelines to follow:

1) Legend: Evaluate what information is needed at that specific point.

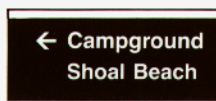
a) Only provide the information necessary to make a decision at that particular location.

b) On directional signs, do not anticipate decisions that can be made later; unnecessary information will confuse the viewer.

c) Provide a second sign at the next decision point. As the user moves through a project, the information on signs should progress from general to specific.



Most general

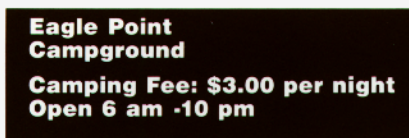


More specific

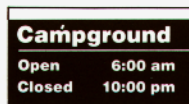
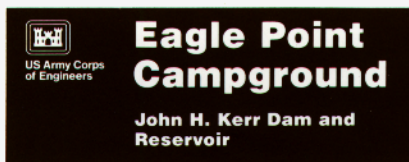


Most specific

2) Sign Type: Define the type of sign that is required at that location to communicate the necessary information. Each sign should have a single purpose. For example, a site identification sign should only identify a site as outlined in Section 5. It should not have other kinds of information on it such as: directional instructions (Section 6), regulatory restrictions (Section 8), or fee symbol (Section 7). A dual-purpose sign dilutes the communicative impact of both messages.

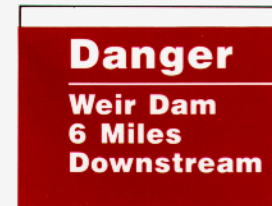


Incorrect: Inappropriate information on an identification sign

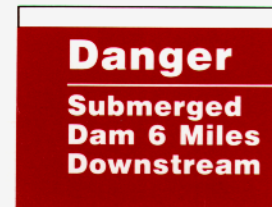


Correct: Three signs, each with the appropriate information

3) Language: Use proper and consistent nomenclature. The words used to convey information should be familiar and comfortable to the viewer. The same wording should be used throughout a project.

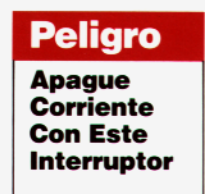
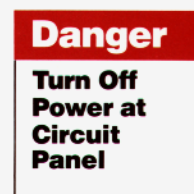


Incorrect: Technical language, not obvious to public



Correct: Simplified language

4) Bilingual Signs: In areas where a significant percentage of the population speaks primarily in a foreign language, the use of symbol signs (Section 8) is encouraged. When no symbols exist or where the use of language is essential, two signs—one in each language—should be placed side by side. These signs will follow the same format: same overall size, letter size and style, color, and mounting. Two languages should never appear on the same sign.



Correct: Two signs with the same message in English and Spanish

5) Positive Tone: Whenever possible, messages should be presented using positive wording, unless it dilutes the clarity of the thought being communicated.

6) Information Order: Determine the hierarchy of information. Western cultures read line-to-line from top to bottom, left to right. In general, the most important message should appear on the first line.

An effectively designed sign integrates a clear, succinct legend with legible, well-spaced typography. The typography should be sized, spaced, and positioned so that the type does not appear to bleed off the edge.

Following are elements that are to be considered in the design of a sign.

1) Legibility: Typography and panel size must be appropriate for the distance and speed at which a sign is viewed. The qualities of an effective sign should also include the following: pure legibility, glance legibility, target value, and priority value.

a) Pure legibility is the maximum distance at which sign copy can be read under optimum conditions, i.e., with no distraction and unlimited time.

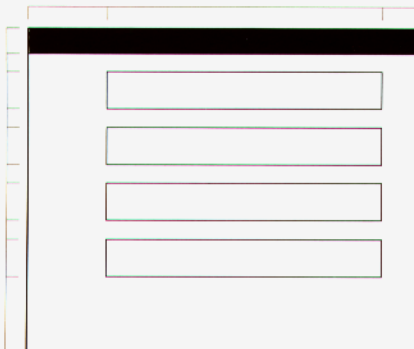
b) Glance legibility is the distance at which a sign can be read swiftly and accurately, such as when a driver must remain aware of other cars and has only a fleeting glimpse of the sign.

c) Target value is the characteristic by which a sign stands out as different from background objects.

d) Priority value is the characteristic by which one sign is seen first from among a number of other similar or identical signs.

2) Sign Format: The philosophy of this manual is that all signs within a recreation area and/or a project should follow a simi-

lar format. This continuity of design will provide a finished look to the area and will assist the visitor to identify quickly the message that is conveyed. The majority of signs used at Corps projects have been standardized. However, some signs may be required for specific purposes not covered in this manual. All special signs should use the grid format for signs of the same functional type as shown in this manual.



Grid format

a) Sign Background: The space on the sign panel around the sign legend is important for the readability of the sign. The border creates a field that separates the sign legend from distracting environmental conditions behind the sign. This increases the target value of the sign and creates a neutral field for the placement of the legend. If the legend is placed too close to

the edge of the sign panel, it may appear to bleed off the edge of the panel when viewed from the targeted distance.



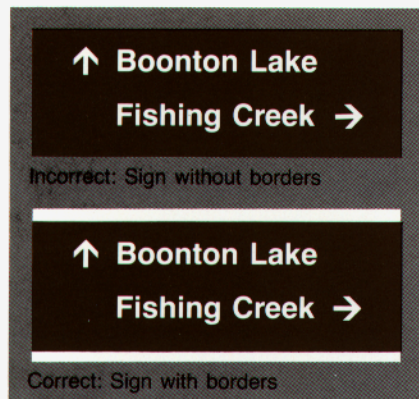
Incorrect: Panel too small for type



Correct: Proper size panel for type

To maximize the target value of a sign, it must have sufficient background area and contrast so that a driver can distinguish it in complex driving environments. There must also be sufficient contrast between the letters and the sign background so that a driver can read the message easily. It is generally recognized that maximizing the background area around the legend will dramatically increase the legibility of the message.

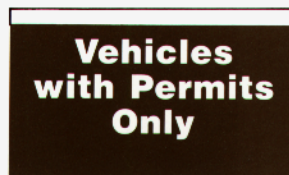
b) Border: The function of the border is that of a "visual container" of the message. It is most effective at night when the border on the top and bottom of the panel is caught and illuminated by headlights, which heightens the target value and signals to the driver the location of the sign. On dark background signs, the border will generally be the same color as the lettering. Contrasting the border with the background heightens the target value of the sign when the color value in the surrounding environment is similar to the value of the sign panel.



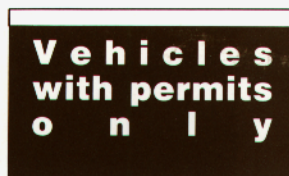
Borders increase the contrast between the sign panel and its background

c) Flush Left Legends: The legends of most signs shown in this manual use a flush left/rag right format. This means that the legend is aligned flush to the left of the layout grid margin. The look of the unjustified right margin is determined by line-break and legend placement within the format.

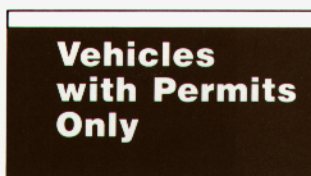
This type of layout has greater readability than if the legend is centered or justified. By using this format throughout, visual consistency is added to all types of signs used in the Corps sign system.



Incorrect: Centered type



Incorrect: Justified type



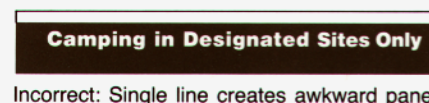
Correct: Flush left type on grid format

d) Legend Line Length: When preparing signs with special legends, visualize the selected message on the sign panel. The look of the sign will be determined in part by the number of words and their layout on the sign panel. How many words, their length, and the length of each line of copy are all factors affecting the look of the sign. The appropriate layout of a sign legend should be carefully designed for: visual balance, legibility, and communicative impact.

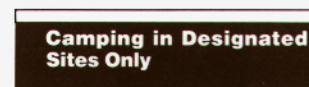
It should be noted that words with the same number of letters may have different lengths. The actual length will depend on the letters in each word. For example, the words "campground" and "recreation" each have ten letters. Yet when set in type,

"campground" is longer because it has individual letters that are wider.

A single message on a sign may be placed on two or more lines to maintain the proportions of the sign panel, except where limited by established grids.



Incorrect: Single line creates awkward panel



Incorrect: Line-break good, but panel unnecessarily long



Correct: Proper line-break for visual balance and pleasing panel shape

A two-line message is visually stronger if the first line is slightly longer than the second.

A three-line message generally has greater visual balance if the middle line is slightly longer than the other two. Obviously, some sign legends will not line-break with this visual consistency. However, it is most important that extreme differences in line length should be minimized, if possible.

Line length can be reduced by utilizing commonly recognized abbreviations, such as St. for Saint or Mt. for Mount. Proper names, however, should always be written out in full and placed on one line. Additional examples of proper line-break formats are shown on pages 5.9-11.

The actual length of a legend can be calculated using the method outlined on page D.2.

The Corps sign system uses the Helvetica letter-style for all sign legends. This sans-serif typeface is both highly legible and readily available to manufacturers. Used in the system are three different weights (stroke widths), each for a specific purpose.

The primary weight, Helvetica Bold, is used for all Standard Identification signs and primary legends on most other types of signs specified in this manual.

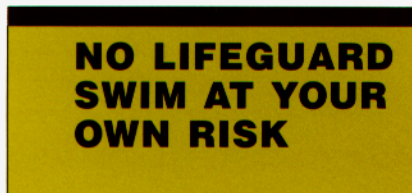
Helvetica Medium is used for the legends of directional signs only.

Helvetica Regular is used for all building interior signs and for selected support legends in combination with the Helvetica Bold typeface.

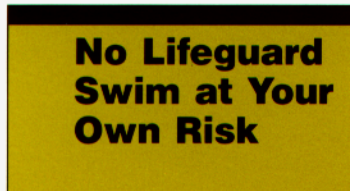
Complete displays of these letter-styles are shown in Appendix D.

The following examples describe the correct use of typography on Corps signs.

1) Upper and Lower Case Legends: For optimum readability, the legends of most signs specified in this manual have upper and lower case legends with initial capital letters. Studies have shown that lower case legends (initial capitals only) are read and understood considerably faster than all upper case sign legends. Upper and lower case words create forms and patterns making each word unique. This increases perceptibility and legibility. Tests



Incorrect: All capital letters



Correct: Initial capital letters

show that legends set in all upper case letters must be read letter for letter, with the exception of only the most common words like LEFT, RIGHT, CAUTION, or STOP, which are read as a form because of a lifetime of conditioning.

2) Letter- and Word-Spacing: Typography viewed from a distance, such as on signs, must have more open letter spacing than typography viewed at close proximity. The spacing between letters in words and between words must be correct for optimum readability. To ensure correct letter- and word-spacing for all Corps signs, a spacing guide is provided in Appendix D.

Cordell Hull

Spacing too tight for signs

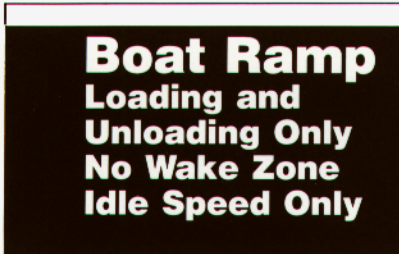
Cordell Hull

Correct spacing for signs

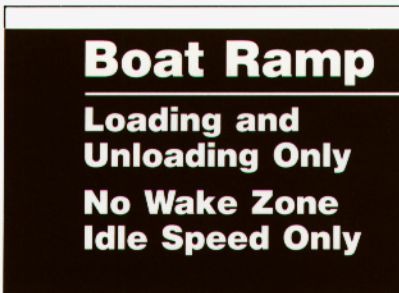
Cordell Hull

Spacing too open for signs

3) Line-Space: The space between multiple-line sign legends is called line-space. The line-space of the examples shown in this manual have been calculated for good legibility and readability. Multiple-line messages are intended to be read as a group without the lines bleeding together when viewed from a distance. Line-space between two different messages is greater than line-space between lines of the same multiple-line message group.



Incorrect: Equal line-spacing between all legend lines



Correct: Line-spacing varies according to the sense of the legend

4) Legend Sizes and Viewing Distance Guidelines: The appropriate size letter is selected for a sign so that the legend will be readable from the viewing distance desired. To that end, most of the signs shown in the manual are available in more than one size so that the properly sized sign can be selected for the specific location.

Once the appropriate viewing distance has been calculated, use the chart on page 2.6 to determine the appropriate size of the primary legend typography of the sign. All signs in the system will be sized around the capital letter height of the primary legend of the sign.

When measuring the size of a capital letter-form, only use flat letters (ABDEFHIKLMNPRTVWXYZ). Round letters (CGJOQSU) will not give an accurate



measurement because they are drawn to extend slightly above and below the base line and height line, respectively. This enlargement compensates for the fact that round shapes appear smaller than square shapes placed in the same size border.

The viewing distance chart below specifies the size of the legend typography appropriate to the distance at which a proposed sign is to be viewed. Type sizes are calculated to meet the Federal Highway Administration Standard for visual acuity. The capital letter height sizes provided in the

second column correspond to the standard type sizes specified throughout this manual. As identified by the symbols, the smaller type sizes are for placement on signs viewed by pedestrians. Signs read from approaching automobiles have larger type sizes. This viewing distance chart also specifies the size of type placed on signs

along waterways, which will be viewed from very long distances.























Although all typography on signs is upper and lower case, the type size is calculated from the height of the initial capital letter. This size is referred to as "A" throughout this manual.

For distances greater than 1,512 feet, the capital letter height of sign legend (A) is calculated by dividing the viewing distance by 28, and rounding up to the nearest inch.

For example, a sign viewed from 2,000 feet would require a legend height of 72" ($2,000 \div 28 = 71.428$ ", rounded up to 72").

In compliance with Federal Highway Administration Standards, letter sizes are calculated for people with at least 20/40 vision.

Viewing distance calculations for motor vehicles are shown for low MPH project roadways. Adjustments for higher speed reaction times, or for a wider cone of vision, are not included in this chart. Letter sizes for these conditions must be calculated on a site by site basis, using Federal Highway Administration Standards.

| Viewing distance (in feet): | Capital letter height (in inches): | Application: | | |
|--------------------------------|---------------------------------------|---|---|---|
| 0-20 | .75 |  | | |
| 21-27 | 1 |  | | |
| 28-41 | 1.5 |  | | |
| 42-55 | 2 |  | | |
| 56-83 | 3 |  |  | |
| 84-111 | 4 |  |  |  |
| 112-167 | 6 | |  |  |
| 168-251 | 9 | |  |  |
| 252-335 | 12 | |  |  |
| 336-503 | 18 | | |  |
| 504-671 | 24 | | |  |
| 672-839 | 30 | | |  |
| 840-1007 | 36 | | |  |
| 1008-1175 | 42 | | |  |
| 1176-1343 | 48 | | |  |
| 1344-1512 | 54 | | |  |

Viewer response time is a function of target value and legibility. In turn, these factors are dependent on contrast between the legend and background color of the sign and on the contrast between the sign and the environment. The primary factors in obtaining a high target value are size of the panel used and color of the sign background. Of color combinations, black and white combinations offer the greatest color contrast but are the least desirable because of poor contrast with the environment, which is predominantly black, white, and gray. Appropriate colors have been specified for each different type of sign shown in this manual. Three functional criteria are used in the selection of the appropriate color for sign legend and panel combinations. These include: color association, contrast, and target value.

1) Color Association: Many sign types inherit their color standards from other sign color systems. These include the *Manual on Uniform Traffic Control Devices* for traffic signs, and the *Occupational Safety and Health Administration Standards* for safety-related signs. Generally these adopted color systems are quite appropriate for their intended purposes. Viewers are familiar with the coded messages of these color combinations—red and white: danger; yellow and black: caution; etc.

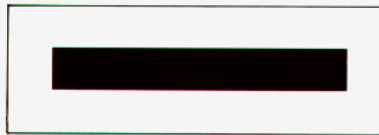
The communicative value of signs with similar functions is heightened by their association with these recognized functional color combinations.

Danger

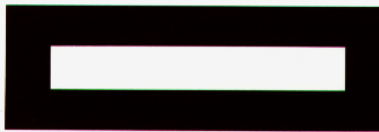
Caution

Recreation

2) Contrast: The difference in color value (light and dark) between message and background must be great enough for good legibility. Legibility is increased when a light color is used on a dark background. The reverse combination tends to "wash out" the legend because of the diffusion of light from the lighter background.



Dark on light

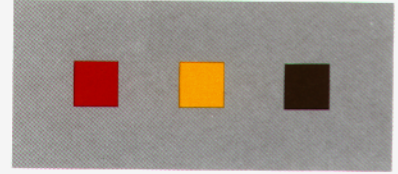


Light on dark



Tone on tone

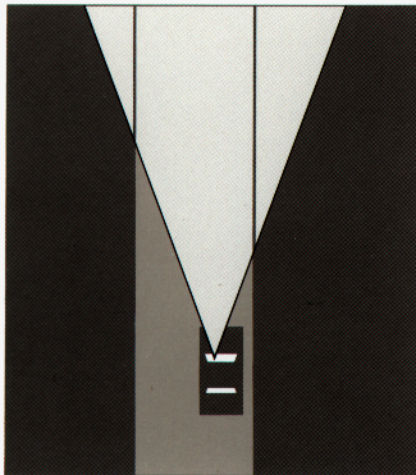
3) Target Value: This characteristic causes a sign to stand out from other signs and objects in the environment. The target value of a sign is increased by size, color contrast to the environment, and sign layout. The signs shown in this manual have been sized and designed for good target value for their functions and intended placement locations.



The color of a sign contributes to its target value

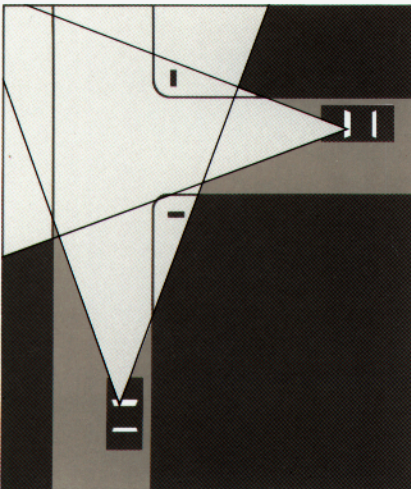
The following are general guidelines for placing signs viewed from an approaching vehicle as well as for mounting signs for pedestrian viewing. Guidelines for specific sign types are shown in their respective sections, and general traffic sign placement guidelines are shown on page 9.9.

1) Straight Ahead: Sign placement must be within the approaching driver's immediate cone-of-vision. Drivers cannot be expected to turn their heads to read a sign. Signs mounted more than 40 feet off the roadway because of special circumstances may require use of a larger panel to increase readability because the sign is outside the normal cone-of-vision.



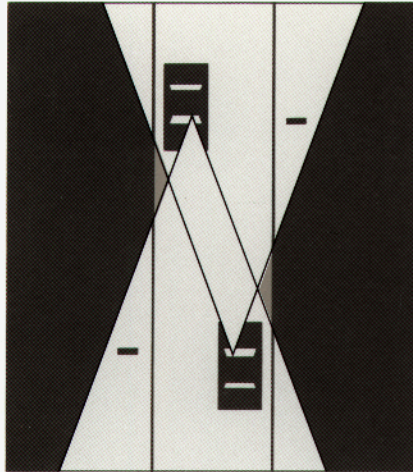
A driver's cone of vision

2) Perpendicular: The sign face should be perpendicular to the approaching viewer. Never place a sign parallel to passing traffic.



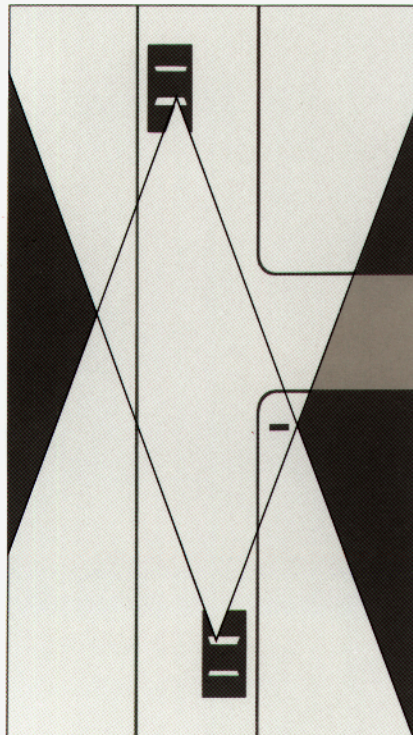
Signs placed perpendicular to the viewer

3) Right Side: Place signs on the right side of the roadway whenever possible. Drivers are not conditioned to look to the left side of the road for critical driving information.



Signs placed on the right-hand side of a roadway

An exception to this rule is the use of a double-face Standard Identification sign mounted perpendicular to a facility entrance roadway. If a double-face sign is used instead of two single-face signs each mounted on the opposite right sides, this sign should be sized and placed with clear target value and readability from both directions.



Double-face Standard Identification sign

4) Distance Legibility: All signs must be clearly legible from the distance at which they are to be read. The viewing distance guide in this section shows the appropriate legend size for each type of sign.

5) Advance Warning: Signs on roadways that communicate a desired reaction, such as "Turn Right at Corner", must be placed in advance of the intersection to afford a safe distance for reaction to and execution of the maneuver.



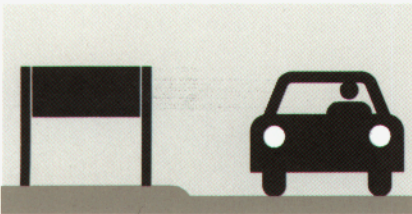
Sign placed well in advance of required action

Refer to Section 14, Lock, Dam and Waterway Signs, for guidelines when placing sign on a waterway to be viewed from both water and land.

6) Viewing Angle: Mount signs at eye level. The height of the average viewer's eye level is 5'-6" standing, and 4'-6" driving a car. Eye level of a viewer driving a truck or recreational vehicle is higher. Signs placed for viewing from long distances will be mounted higher than those in the immediate foreground. Mounting height requirements are shown in each section for each specific sign type.



Pedestrian viewing



Vehicular viewing

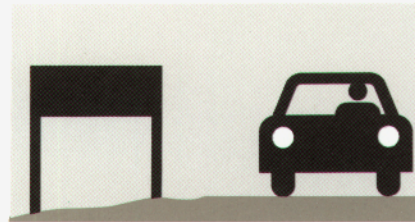
Mounting height is measured from the ground level to the bottom edge of the sign panel. For signs mounted along roadways, the grade of the road is considered ground level. When ground mounted signs on two posts are placed on sloping or inclined grades, adjustments must be made to the post lengths and mounting heights. Extreme differences between post lengths should be minimized whenever possible.

7) Spacing: Signs must be located with respect to other signs. Mounting sites should be carefully selected so that groups of signs are placed without creating a cluttered appearance. Also, drivers must be given time to read and react to one sign before another is presented.

8) Sign Location and Site Preparation: Placement must be carefully considered to ensure that each sign fits its location and achieves optimum visibility. Signs should be placed against a simple uniform background of a building wall, native vegetation or open sky to reduce distraction and visual confusion. Traffic signs and directional signs are normally located along roadways or walkways and should not receive any ornamental landscaping which would distract the viewer or obscure the sign. Avoid excessive clearing or the need for continual grounds maintenance, but it may be necessary to do some site work prior to placing a sign.

Standard Identification sign siting may require special consideration of views or

the visual relationship with the named project area or structure. Where possible, identification signs should be located so that it relates to the entry of facility being

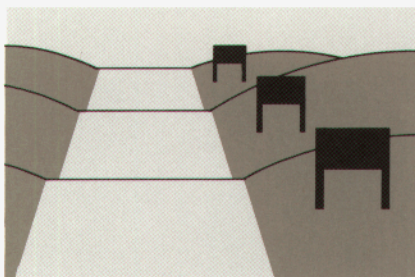


Post lengths adjusted for a grade sloping down from the road.



Post lengths adjusted for a grade sloping up from the road.

signed. Carefully designed landscaping may be permitted around Standard Identification signs only. The siting and landscaping of identification signs should be reviewed by the Division/District Sign Program Manager and a Division/District landscape architect.



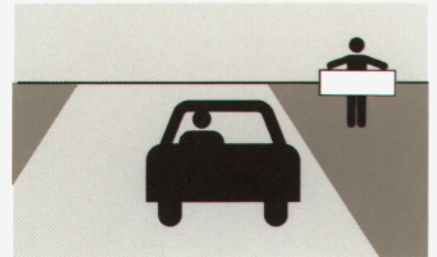
Signs spaced to allow driver to read and react to each one independently

Landscape planting may be permitted with Standard Identification signs. This planting is ideally used to frame the background behind the sign, creating an orderly overall area view. Elaborate, domestic planting around the base of the sign is not recommended. A simple use of low growing ground cover around the sign with shrubs in the background is appropriate. Plants selected should be native or locally naturalized species that blend well with their surroundings and do not visually compete with the sign itself. Effective plant selection should be used to reduce maintenance.

9) Field Test: An effective way to determine a sign placement location is to place the actual sign in the proposed location for verification. This is relatively

simple for pedestrian signs; they are viewed from relatively short distances. For signs viewed from a moving vehicle, testing will include driving the approach from which it is viewed to verify the appropriateness of the proposed location. Since sign location plans are usually prepared prior to the ordering of the actual sign, a cardboard or brown paper banner, the same size as the proposed sign, can be used to check placement against the criteria above.

10) Breakaway Posts: The Corps Sign Standards Manual specifies wood posts for roadway directional signs because they are the least expensive and generally most utilitarian way to mount guide signs on conventional and project roads. Any sign with posts larger than 4" x 4" should be of a yielding design. To make a post frangible, refer to local highway department specifications for proper drilling of post at the base (see page B.2a).



Field test to verify proper sign placement

Normally, signs should not be closer than 6 feet from the edge of the shoulder (14'-16'). If there is no shoulder, mount a sign a minimum of 12 feet from the edge of the traveled way. In areas where sign posts must be placed closer to the road, the posts should be of a suitable break-away design.

If a sign is in the safety zone, federal guidelines require that the uprights of double post signs be at least 84" apart. The intent is to keep a driver from hitting more than one post at a time. If the sign is not 84" wide between the uprights, and has posts larger than 4" x 4", it is recommended that the sign be frangible or placed outside the immediate right-of-way assuming site conditions allow. If beyond the edge of the road, the sign must still be within the drivers normal cone-of-vision. Generally the cone-of-vision will easily allow this adjustment without a problem if the sign is sized to the approach speed as delineated in the manual (see pages 5.16-18).

Should site conditions require a single post design, the other option is to use a single steel post with breakaway base plate, with full cement footing and companion base plate engineered for this installation. The local state highway department should have a standard specification for this purpose.

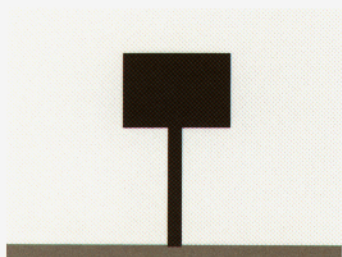
Sign mounting methods have been standardized to create visual uniformity for all signs placed around a facility. Mounting heights and locations have been determined for ease of reading.

There are two principal methods of mounting signs. These are:

- 1) Ground Mounted: Placing a sign panel on one or more posts fixed in the ground.

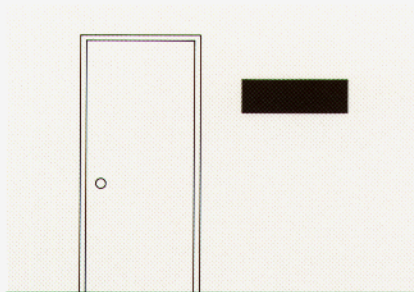


Ground mounted with two posts



Ground mounted with a single post

- 2) Wall Mounted: Placing a sign on a vertical surface such as the wall or door of a building or fence.

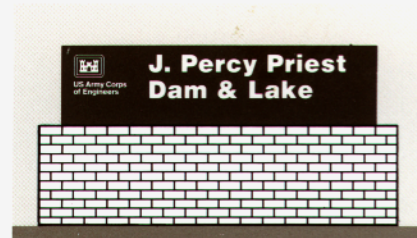


Wall mounted

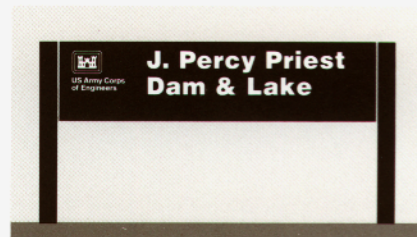
Each type of sign utilizes a mounting method appropriate to the viewing requirements. A sign must be positioned with a clear line-of-sight from the viewing point to the sign face. General sign locations will be established on the sign plan. Specific locations should be drawn on detailed site plans only after the placement location has been field-checked for accuracy.

When a new sign replaces an old sign that does not comply with the standards shown in this manual, the entire sign assembly should be replaced. All old sign bases should be removed and the site cleared prior to the placement of the new sign.

Mount signs using wood posts unless otherwise specified. Wooden signposts used consistently throughout a project are visually more harmonious with the surrounding landscape. They also provide a more finished look to a sign installation than metal posts. The standard for most small signs will be a nominal 4" x 4" redwood post (No. 2 grade or better, well-seasoned, and free from defects). Larger signs may be specified with structural grade posts of other wood types.



Incorrect: New sign panel on old base

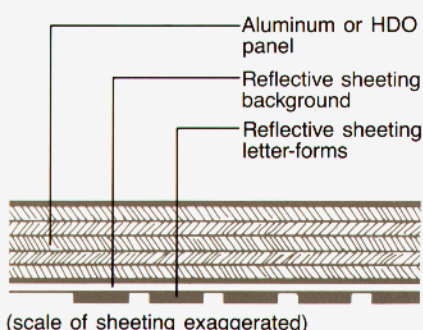


Correct: Appropriate mounting for this sign type

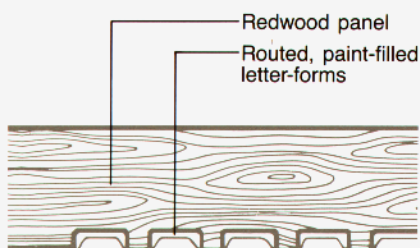
Within each section there are rules and recommendations concerning materials to be used for each category of sign. These materials have been specified because of their proven suitability for these applications. None of the materials or fabrication techniques specified in this manual are exotic or proprietary. They have been tailored to their respective uses and employ standard industry practices and supplies.

The majority of standard project identification signs and those signs placed in recreation areas and on waterways use the following two basic materials and fabrication processes:

– Plan section through HDO plywood or aluminum sign and post, with applied or screen-printed legend on reflective sheeting background:



– Plan section through a redwood sign and post, with routed and paint-filled legend:



Special-use signs are made from a variety of materials and reproduction processes suited to the requirements of the sign. For example: interpretive signs can be made from porcelain enamel or photo-engraved aluminum; boundary markers from screen-printed polyethylene; and building interior signs from acrylic with screen-printed legends.

All of the various alternatives are outlined in the respective sections for each sign type. Assuming that all of the possible materials are equally appropriate, materials selection will be determined by the following criteria:

1) Longevity: All of the materials specified have a long life. Redwood signs, if properly maintained, will last 15-20 years. Reflec-

tive sheeting is guaranteed for 7 years and will generally last longer. Signposts that are not redwood may need to be replaced on a shorter life cycle, depending on environmental conditions.

Though some signs may be replaced—due to damage and periodic updating—before the projected lifetime of the materials expires, using lower grade materials than those recommended is ultimately more costly. This is because signs made with high grade materials will need replacing less often than signs made with inferior materials which deteriorate faster. The cost difference between the high grade and inferior materials is minimal; labor costs for fabrication and placement account for a significant portion of the overall expense.

2) Budget: Where possible, signs have been standardized and can be ordered off-the-shelf from suppliers. Signs requiring custom legends will obviously be more expensive than standard items ordered from stock.

Generally, the single most expensive sign in an area will be the Standard Identification sign. Because of the impression it will make over its 10-20 year life, this expense is justified. The cost difference between Standard Identification signs made of routed redwood and signs with metal frames and reflective sheeting on sign panels is negligible when based on life cycle expenditures.

The cost of the sign includes not just purchase and installation, but also the cost to maintain it over its lifetime. A sign that costs less to purchase than another may actually be more expensive when refinishing and replacement are considered.

3) Maintenance Requirements: The maintenance requirements of a sign depend upon the material chosen. Redwood signs will last for 15-20 years. Ideally they should be cleaned with a mild soap and sealed on a regular basis. Reflective sheeting signs will last between 7-10 years, but need to be cleaned routinely. All recommended materials have been chosen for durability and ease of maintenance, but there are variations. Assess the requirements of each possible material against the maintenance capabilities and costs at a given site. All materials require some maintenance; frequent, scheduled inspections are necessary to ensure that they are in place and undamaged.

All of the materials outlined in this manual have been designed to be vandal-resistant. Fabrication techniques, such as the use of tamper-resistant hardware, have been specified. However, no sign is completely vandal-proof. Some materials and methods of construction are more resistant than others. Often a vandalism problem is specific to a location. This includes carving the surface of wood signs, painting graffiti,

or using the signs for target practice. If vandalism is a problem at a given site, the material selected should counter the specific type of damage being incurred.

4) Material Legibility: A flat sign face generally is a more legible sign than one with a routed legend. Light creates shadows in routed letter-forms that may distort its legibility. Therefore, signs requiring a consistently high level of glance legibility (such as highway directional and traffic control signs) should not be fabricated from routed redwood. On the other hand, routed redwood identification signs may be placed at entrances and within projects where a small percentage of legibility loss may be sacrificed for the harmonious visual effect created by the use of natural materials.

Sign programs at most projects will use both types of sign materials. The selected material will depend on the intended function of the sign.



Routed letter-form

Applied letter-form

5) Aesthetics: Regardless of sign material selected, the overall aesthetic effect of total project sign installation is that of looking uniform and tailored. Sign placement should reflect a sense of visual order. Nothing is more visually chaotic than too many signs placed randomly in a small area. Proper sign maintenance is critical to upholding a high aesthetic standard. Finally, mounting materials and heights should be standardized for visual uniformity.

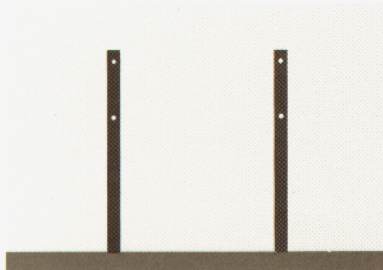
It is essential to recognize that each sign is part of a family of signs within a Corps facility, and as such the selection of materials for each location should maintain visual continuity.

In summary, to evaluate materials: compare the initial costs to material longevity; determine maintenance costs over time; and evaluate the overall visual effect of all signs in the project. Keep in mind that aesthetic quality will depend more on the appropriate use of materials and the proper layout of typography than on the amount of money spent on an individual sign.

The maintenance of signs is an integral part of comprehensive sign program management. This includes inspecting, repairing, replacing, removing, cleaning, and refinishing. The effectiveness of the total sign system is only as good as the maintenance rendered. Missing, broken or illegible signs cause confusion and accidents and diminish the cumulative effect of the whole sign program. Poor maintenance reflects an attitude of neglect, which in turn can lead to abuse of an area and encourage vandalism.

A maintenance program begins with a comprehensive field inspection of all signs. Use a site plan to locate signs, along with a sign schedule describing the message, materials, mounting methods, and installation dates of each (see Section 3, Planning). Establish a schedule and designate an individual to check each sign on the plan and evaluate the following:

1) Is the sign in place?



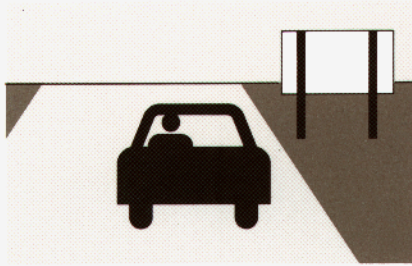
Sign panel missing

2) Is the sign still necessary?



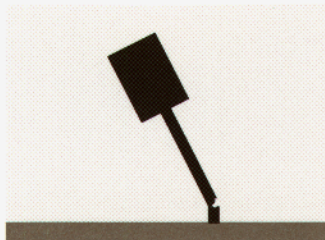
Redundant signs

3) Is the sign upright and facing in the right direction?



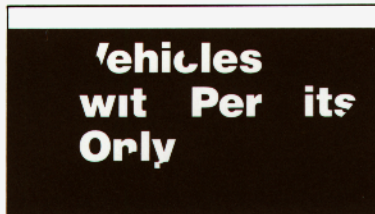
Sign facing in wrong direction

4) Are the supports in good condition?

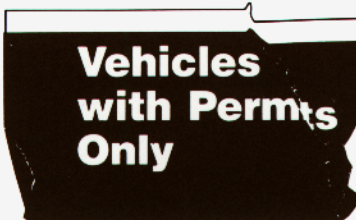


Broken post

5) Is the face in good condition?

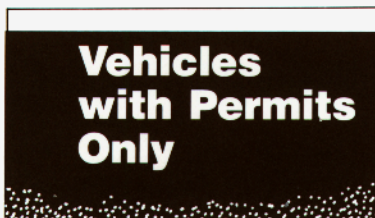


Missing letters



Bent face

6) Is the surface dirty?



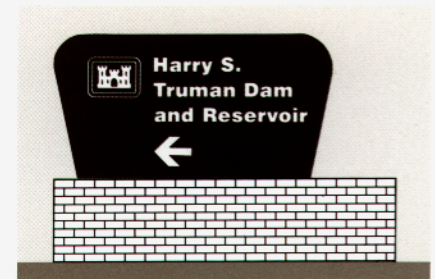
Mildew or fungus

7) Is the sign obscured by foliage?



Leaves in front of sign

8) Is the sign in compliance with this manual?



Sign not in compliance

9) Should maintenance work be requested to correct deficiency?

Following this evaluation, orders for removal, replacement or maintenance should be prepared, and maintenance work done in a systematic manner. It is important that maintenance crews and rangers note damaged signs on maintenance work orders as part of their routine work and promptly have the repair work completed. The frequent scheduled inspections and routine observations are complementary, forming a total maintenance program. Appendix C outlines in detail the procedures necessary for a comprehensive sign maintenance program. This information should be incorporated into the sign plan (see Section 3) so that maintenance and replacement are coordinated.

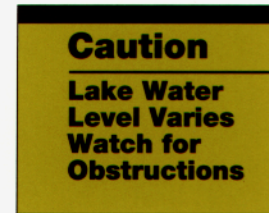
2. Caution/Warning Signs

These signs are used to call attention to a potential danger, or a hazard capable of resulting in moderate to severe injury or damage. In some instances, the hazards may be the same as those associated with Danger signs but are of significantly less magnitude.

2.1 Recreation sites

To caution viewers about potential hazardous conditions.

Typeface: *Helvetica Bold*
Legend color: *Black*
Panel color: *Lemon-Yellow (chartreuse)*
Rule/bar: *Black*
Grid format: *1*



2.2 Waterways

To warn boaters approaching a hazardous area.

Typeface: *Helvetica Medium*
Legend color: *Black*
Panel color: *Lemon-Yellow (chartreuse)*
Rule/bar: *Black*
Grid format: *1*



2.3 Industrial Safety

In shops and around dams to warn of hazards.

Typeface: *Helvetica Bold*
Legend color: *Yellow on black bar, black on yellow panel*
Panel color: *Safety Yellow*
Bar: *Black*
Grid format: *A*



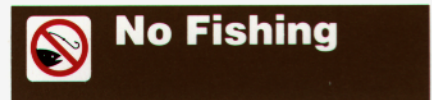
3. Symbol Signs

Within a recreation facility a symbol sign may be used in lieu of a safety sign as a more user friendly method to define specific rules at a location. Used with other symbol signs at the same location, these pictographs rely on a common graphic shorthand for all prohibitions in public areas.

3.1 Slat System with Prohibition Symbol

Used at the entry to introduce prohibitions and safety-related information for a facility.

Typeface: *Helvetica Bold*
Legend color: *White*
Panel color: *Corps Brown*
Symbol: *Black*
Circle/slash: *Red on white background*
Grid format: *A*



3.2 Prohibition Symbol

Used at specific locations where applicable in lieu of a written safety sign.

Typeface: *Helvetica Bold*
Legend color: *Black*
Panel color: *White*
Symbol: *Black*
Circle/slash: *Red*
Grid format: *A*

